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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,184	12/21/2001	Mahmoud M. Khojasteh	FIS9-2001-0380-US1	1912

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INTERNATIONAL BUSINESS MACHINES CORPORATION
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EXAMINER

HAMILTON, CYNTHIA

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 08/27/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/026,184

Applicant(s)

KHOJASTEH ET AL.

Examiner

Cynthia Hamilton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12-21-01, 8/4/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 12 and 14-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

1. Claims 12 and 14-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 7.

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-11 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The examiner notes for the record that applicants on page 6, first paragraph, have not defined "cyclic ether moieties" but examples of them include not only ethers but thioethers as well, i.e. thirithiane and tetrathiane. Ethers are recognized by workers of ordinary skill in the art to be compounds of the general formula R-O-R, AR-O-R or Ar-O-Ar as set forth by Morrison et al on page 552. Thioethers are referenced by Morrison et al on page 1173, mid page, as sulfur analogs of ethers, but do not refer to the thioethers as ethers. IUPAC Recommendations 1994 defines ethers the same using R-O-R with R not equal to H on page 7. R is defined on page 4 of IUPAC as any hydrocarbyl group or H unless its meaning is specifically qualified as it is on page 7 to exclude H. IUPAC defines "epoxides" as a subclass of epoxy compounds containing a saturated three-membered cyclic ether under "epoxide

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compound" on page 7. The examiner uses the word "thioether" with respect to thrithiane and tetrathiane but IUPAC refers to thioethers on page 16 as a "Former name for sulfides RSR (R not equal to H)." Because applicants use "ether" to include thioethers as shown by example, then are silylethers such as those in Higashi et al in col. 3, lines 49-59, included? It is noted that while Higashi et al (4,877,719) does not disclose a cyclic silylether, such are known as shown by Burns et al (5,290,901) in col. 2, lines 20-45. The examiner believes that workers of ordinary skill in the art would not clearly understand where the limits of "cyclic ether moieties" in the instant claims and specification because of the disclosure on page 6 of the instant specification. Are thioepoxies included? Thus, there is confusion as to what is meant by "ether" in claims 1-11 and 13 and these claims are held indefinite for this reason. The examiner has examined only as far as ethers as generally defined by IUPAC and thioethers because applicants included examples of such in their specification.

4. The examiner notes that "saturated polycyclic moieties" does not exclude a cyclic ether as one of the rings that make up the polycyclic moiety. The only requirement is that the polycyclic moiety be saturated. There is no requirement that the polycyclic moiety be fused or bridged. "Polycyclic" is defined by the American Heritage Dictionary as "Having two or more atomic rings in a molecule". Thus, in its broadest reasonable definition, the instant "saturated polycyclic moieties" are moieties with two or more saturated rings on them. On page 6 of the instant specification, applicants do not define this term but give preferable limits such as "a cyclic olefin monomer" or norbornyl, isonorbornyl or adamantyl, or are pendant from acrylate monomers. None of these are clear limits on the term "saturated polycyclic moieties" itself.

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5. The examiner notes that applicants do not require a "moiety" to be limited to only one moiety per polymer mer as shown on page 7 of the specification with (I) having both cyclic ether moiety and unsaturated polycyclic moieties on the same pendant group and the cyclic ether moiety being part of the unsaturated polycyclic moiety.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7.

8. Claims 1-3, 5-7 and 10 are rejected under 35 U.S.C. 102(a or e) as being anticipated by Hiwara et al (6,166,100). Hiwara et al is clearly prior art under 35 USC 102 (e). It is also prior art under 35 USC 102 (a) because the effective filing date for instant claims 1-3, 5-7 and 10 is the filing date of this application which is December 21, 2001. The parent application, SN 09/514,212 does not fully support under 35 USC 112 instant claims 1-3, 5-7 and 10. What support is found is in Examples 8 and 9 of said parent application wherein the polymer is poly(para-hydroxystyrene-co-epoxydicyclopentadiene methacrylate) and the broadest generic description of the underlayer polymer is found on page 9 lines 10-13 of the original specification wherein

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"Suitable organic polymeric, planarizing underlayers for the resist of the present invention include cross-linked poly (hydroxystyrene), polyesters, polyacrylates, cyclic -olefin polymers and the like" and in original claim 50 , i.e. "wherein the under layer is an organic polymer comprising one or more of the monomers selected from the group consisting of acrylate, cyclic-olefin, hydroxystyrene, and epoxy monomers." Claims 1-3, 5-7, and 10 are generic to the one species in the parent application. The one species given is insufficient support for the entire genus claimed. See particularly MPEP 706.2 (a), DETERMINING THE EFFECTIVE FILING DATE OF THE APPLICATION. The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species. A "representative number of species" means that the species which are adequately described are representative of the entire genus. Thus, when there is substantial variation within the genus, one must describe a sufficient variety of species to reflect the variation within the genus. Hiwara et al in Example 5 in col. 17-18 and col. 21, lines 1-28, disclose a pigmented composition comprised of a cationic polymerization initiator and poly(3,4-epoxy cyclohexyl methacrylate-co-glycidyl methacrylate-co-styrene-co-methyl methacrylate) labeled h wherein 3,4-epoxy cyclohexyl is both the instant cyclic ether moiety and the saturated polycyclic moiety, i.e. a cyclohexyl ring fused to a saturated epoxy ring at the 3 and 4 carbons, glycidyl is a cyclic ether moiety, and styrene is an aromatic moiety. The cationic initiator for this composition is set forth in Table 4 in Comparative Ex 1 and it is a cationic photopolymerization initiator, UVI 6990. This composition anticipates the instant invention of instant claims 1-3, 5-7 and 10. The composition is inherently suitable

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for use as a planarizing under layer in a multilayer lithographic process and the composition is not the same species disclosed in the parent application.

9. Claims 1-3, 5, and 10 rejected under 35 U.S.C. 102(a or e) as being anticipated by Asakawa et al (6,280,897). In Asakawa et al, see particularly col. 59-60 and col. 69-70 with reference to PI-31 and PI-32 and Example I-7 and Table 7. With respect to instant claims 1-3, 5, and 10, the compositions of Asakawa et al in Example I-7 wherein PI-31 or PI-32 are used anticipate the instant compositions wherein a photo acid generator is present and the first pendent group is a saturated polycyclic moiety, the second pendent group is an aromatic moiety and the third pendent group is a cyclic ether moiety. These composition of Asakawa et al are inherently suitable for use as a planarizing underlayer in a multilayer lithographic process. Claims 1-3, 5, and 10 are generic to the one species in the parent application. The one species given is insufficient support for the entire genus claimed. See particularly MPEP 706.2 (a), DETERMINING THE EFFECTIVE FILING DATE OF THE APPLICATION. The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species. A "representative number of species" means that the species which are adequately described are representative of the entire genus. Thus, when there is substantial variation within the genus, one must describe a sufficient variety of species to reflect the variation within the genus to support the genus. Thus, since the parent application does not Asakawa et al used to reject the claims under 35 U.S.C. 102(a) as well as 35 U.S.C. 102(e).

10. The examiner notes for the record that DERWENT-ACC-No: 1999-271000 shows the family of patents to which Asakawa et al (6,280,897 B1) belongs contains KR

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98064842 A which has a publication date of October 7, 1998. This document is being ordered but there is no evidence at this time it contains the PI-31 and PI 32 polymers found in the US document. Thus, no rejection under DERWENT-ACC-No: 1999-271000 and KR 98064842 A can be made at this time. The examiner does warn applicants of the document as to alert them to the possibility of prior art of sufficient age as to be applicable under 35 USC 102(b) at a later stage in prosecution.

11. Claims 1-3, 5-7 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Perez et al (6,235,850 B1). Examples 16-17 and 19-25 as shown in Table 1 of Perez et al anticipate the instant compositions of instant claims 1-3, 5-7 and 10.

12. Claims 1-3, 5-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perez et al (6,235,850 B1). Perez et al teach the formation of a polymer composition which requires the presence of a terpolymer made from a monomer with an epoxy group and a monomer with an aromatic group and a third monomer with one of 6 preferred being isobornyl acrylate. This composition also has added either a thermal curing catalyst or a photo curing catalyst of which these are cationic catalysts, i.e. they generate an acid. With respect to instant claims 1-3, 5-8 and 10, the use of any of the 6 preferred monomers for the tackifier of Perez et al would have been prima facie obvious as would have been the use of a thermal catalyst to cure the adhesive made from the polymer of Perez et al since Examples 16-17 and 19-25 as shown in Table 1 of Perez et al use isobornyl acrylate in making their polymers and the use of thermal catalysts is also taught as one of two well known classes of curing catalysts to be used.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yasunami et al (US 2002/0028409 A1) is cited to show the mixed

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use of aromatic moieties and saturated polycyclo moieties in heat curable under layers in positive resist laminates. Epoxy resins are cited in [0109] as additives and the polymers found on pages 12-14 have crosslinkable moieties which would make them readable on nonelected claim 19. However, there are no pendent epoxy groups on the polymers of Yasunami et al. Urano et al (5,677,112) teach the use of underlayers wherein anthracenyl crosslinkers are mixed with polyglycidyl and saturated polycyclo polymers to be heat cured to form layers with both aromatic and saturated polycyclo groups in the same crosslinked layer, but Urano et al do not use any added acid generator to cure their layers nor do they disclose a polymer with all three instant moieties present at the same time. However, the exchange of anthracenyl for adamantyl or norbornyl groups is taught in col. 15. Foster et al (6054248 cited by applicants) teaches crosslinking thermally a polymer with both aromatic and polycyclo groups to form an under layer for a photoresist stack. There are no epoxy groups in Foster et al. Plum (4,710,556) teaches the polymer but not the addition of an acid generator. In Plum see Example 5. Enomoto et al (6,495,305) teaches halogenating the antireflective binder to help etch resistance.

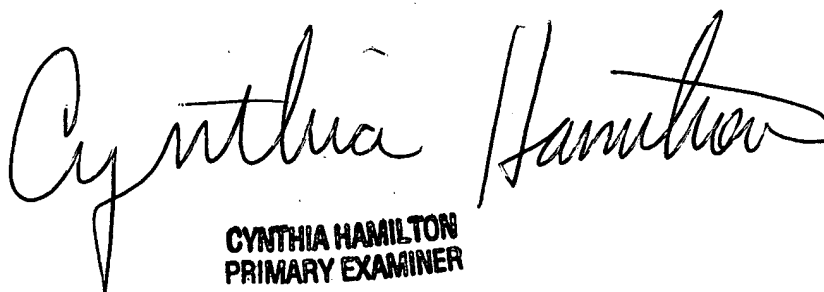
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Primary Examiner Cynthia Hamilton whose telephone number is (703) 308-3626. The examiner can normally be reached on Monday-Friday, 9:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on (703) 308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application should be directed to the 1700 receptionist whose telephone number is (703) 308-0661.

Cynthia Hamilton
August 23, 2003


**CYNTHIA HAMILTON
PRIMARY EXAMINER**